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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/067,905	02/08/2002	Sankar Dasgupta	T8466406US	8030

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CANADA

EXAMINER

ALEJANDRO, RAYMOND

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 09/17/2003

2

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/067,905

Applicant(s)

DASGUPTA ET AL.

Examiner

Raymond Alejandro

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02/08/00.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☒ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Oath/Declaration

1. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:

It does not identify the mailing or post office address of each inventor. A mailing or post office address is an address at which an inventor customarily receives his or her mail and may be either a home or business address. The mailing or post office address should include the ZIP Code designation. The mailing or post office address may be provided in an application data sheet or a supplemental oath or declaration. See 37 CFR 1.63(c) and 37 CFR 1.76.

Drawings

2. The sheets of drawings filed on 02/08/02 have been accepted.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 16 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Claim 16 recites the limitation "said vacuum" in line 2. There is insufficient antecedent basis for this limitation in the claim. It is noted that claim 11 does not provide antecedent basis for the language "said vacuum".

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 1-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohsaki et al 5856043 in view of Nakagiri et al 6558841.

The present application is directed to an anode for a lithium battery wherein the disclosed inventive concept comprises the specific weight percent carbon fibres.

With respect to claims 1, 8 and 19:

Ohsaki et al disclose a non-aqueous electrolyte secondary battery (TITLE) wherein the battery comprises an anode comprising a graphitized vapor-grown carbon fibers (ABSTRACT) wherein the anode is a compacted body comprising pressed graphitized vapor-grown carbon fibers (COL 3, lines 40-50) wherein the anode also comprises a binder made from a polymeric resin and an electric conductor (*the substrate*) having a function of supporting the electrode

Art Unit: 1745

material (COL 6, lines 23-40). Ohsaki et al also teach the spherical graphite which is a mesocarbon microbeads and a mesocarbon fiber (COL 3, lines 61-63).

With respect to claims 2 and 9:

It is disclosed that the vapor-grown carbon fibers has a diameter no greater than 70 nm (COL 6, lines 14-20). Ohsaki et al also teach the spherical graphite which is a mesocarbon microbeads and a mesocarbon fiber (COL 3, lines 61-63).

With respect to claims 4 and 11:

It is disclosed that the carbon fibers are vapor grown carbon fibers (ABSTRACT/COL 5, lines 38-42/COL 6, lines 14-19).

With respect to claims 5-6, 12-13 and 15-18:

As to the method limitation, *i.e. having the nano-fibres subject to the specific vacuum and heat treatment*, it is noted that a method limitation incorporated into a product claim does not patentable distinguish the product because what is given patentably consideration is the product itself and not the manner in which the product was made. Therefore, the patentability of a product is independent of how it was made.

With respect to claims 7 and 14:

It is disclosed that the electric conductor is made from copper (COL 6, lines 30-40).

Ohsaki et al disclose a secondary battery comprising an anode material according to the aforementioned aspects. However, Ohsaki et al do not disclose the specific weight percent of the carbon fiber and the specific average diameter and length of the graphite carbon.

As to claims 1-3, 8-10 and 15:

Nakagiri et al disclose a negative electrode for non-aqueous electrolyte rechargeable batteries (TITLE) wherein the negative electrode comprises an electronically conductive material being a carbonaceous material comprising fibrous carbon having a fiber length of 1-20 μm and a diameter of 0.1-0.5 μm , and said fibrous carbon in the carbonaceous material is in the range of 1-20 wt % of the active material and said electronically conductive material (CLAIM 1). It is disclosed that the carbonaceous material include graphite type carbons such as artificial graphite, natural or scaly graphite and the like and expanded graphite (COL 5, lines 45-55), and it is also preferable to use a fibrous carbon together (COL 5, lines 60-62) wherein the carbonaceous material include the fibrous carbon such as vapor-phase growth carbon fiber (COL 6, lines 5-15).

Particularly, Nakagiri et al teach specific examples wherein the percentage of fibrous carbon (fiber %) is 1 %, 10 % and 20 % (See **TABLE 6**) as well as the length being approximately 10 μm and the diameter approximately 0.25 μm (*that is to say, about 200 nm*) (See **EXAMPLE 5**). Also, **Table 5** shows different length and diameter dimensions of the fibrous carbon including diameter ranging from 0.1 to 0.5 μm and length of at least 20 μm (COL 17, line 50 to COL 18, line 12).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to include the specific weight percent of the carbon fiber of Nakagiri et al in the anode of Ohsaki et al as Nakagiri et al disclose that in the range where the ratio of the fibrous carbon in the carbonaceous material is 1-20 wt % for the composite particle of the negative electrode material, every cycle life for the active material particle of the material exhibit 92 % or more, which indicates satisfactory cycle life characteristics. This seems to indicate that, in the case where the ratio of fibrous carbon is less than 1 wt % for the composite particle of the

Art Unit: 1745

negative electrode material, the effect of the present range, which employs the increase of the contact point due to the fibrous carbon and the large recovery force thereof, can hardly emerge, and in the case 50 wt % or more, the decrease of the charging and discharging capacity is occurring and so is the coagulation of the fibrous carbon. *Thus, Nakagiri et al directly teach the weight percent of the carbon fibers within the claimed range.*

As to the specific average diameter and length of the graphite carbon, it would have been obvious to one skilled in the art at the time the invention was made to make the carbon fiber of Ohsaki et al by having the specific average diameter and length of the graphite carbon of Nakagiri et al as Nakagiri et al disclose that in the case that the length of the fibrous carbon is less than 1 μm , which is short, the discharging capacity of the initial cycle becomes small and the cycle life becomes poor. It is considered that this is because electric contacts among the active material particles are not satisfactory so that the electron conductance network, which is supposed to contribute to the electrochemical reaction of all particles, cannot be made and active material particles, which cannot relate to the electrochemical reaction, are appeared. And in the case that the length of the fibrous carbon exceeds 20 μm , the discharging capacity of the initial cycle again becomes small and the cycle life also becomes poor. It is considered that this is because the fibrous carbon entangles to coagulate and the dispersion properties of the fibrous carbon for the active material particles are not satisfactory so that the contact points between the active material particles and the fibrous carbon become fewer, which generates the active material particles that cannot relate to the electrochemical reaction. And in the case that the diameter of the fibrous carbon exceeds 0.5 μm , the initial discharging capacity and cycle life both become somewhat smaller. It is considered that this is because, in spite of the fact that the

Art Unit: 1745

ratio of the fibrous carbon in a form of fine threads decreases so that the surface in the diameter direction becomes more prone to contact the active material particles than the surface in the longitudinal direction, the surface including the diameter direction lacks the flexibility, of which the condition is close to that of a plane. And, therefore, the effect of increasing the contact points in accordance with the present anode can hardly emerge. *Thus, Nakagiri et al directly teach the carbon fiber diameter and length within the claimed range.*

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (703) 306-3326. The examiner can normally be reached on Monday-Thursday (8:30 am - 7:00 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (703) 308-2383. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Raymond Alejandro
Examiner
Art Unit 1745

A handwritten signature in black ink, appearing to read 'RAM', with a long horizontal line extending to the right.